

SAND LIGHTWEIGHT CONCRETE

(10-12-01)

Use sand lightweight concrete, as noted on the plans, that meets the requirements of this Special Provision.

Sand lightweight concrete is composed of portland cement, fine aggregate, lightweight coarse aggregate, water, and admixtures. Provide sand lightweight concrete that complies with the applicable requirements of Sections 420, 1000, and 1024 of the Standard Specifications and the additional requirements herein.

Submit a mix design from a testing laboratory approved by the NC Division of Highways for approval at least 35 days prior to the proposed use. Provide a mix with a minimum cement content of 715 lbs/yd³ (424 kg/m³), a maximum water/cement ratio of 0.42, and meeting the following design criteria:

TEST	TEST METHOD	REQUIREMENT
Min. 28 Day Compressive Strength, psi (MPa)	AASHTO T22	4500 (31.0)
Max. Unit Weight, plastic, lbs/ft ³ (kg/m ³)	AASHTO T121	120 (1925)
Max. Unit Weight, dry, lbs/ft ³ (kg/m ³)	ASTM C567 using equilibrium air dried unit weight	115 (1845)
Slump, in (mm)	AASHTO T119	2 - 4 (50 – 100)
Air Content, total entrapped and entrained (percent)	AASHTO T196	6.0 ±1.5
Min. Relative Dynamic Modulus, (percent)	AASHTO T161 Procedure A	80

When submitting the mix design, include the source of the aggregates, cement, and admixtures and the gradation, specific gravity and fineness modulus (fine aggregate only) of the aggregates. Submit test results showing the mix design conforms to the criteria, including the 28 day compressive strength of a minimum of six cylinders. Provide a mix design that produces an average compressive strength sufficient to ensure that a minimum strength of 4500 psi (31.0 MPa) is achieved in the field.

Produce an additional mix in accordance with AASHTO M195 to determine the drying shrinkage. The maximum drying shrinkage for this mix is 0.07%.

For lightweight aggregate, use expanded shale or slate that meets the requirements of AASHTO M195. Grade the lightweight aggregate as follows:

Sieve Size	Passing Square Opening Sieves (Percent by Weight)
1" (25 mm)	100
3/4" (19 mm)	90 - 100
3/8" (9.5 mm)	10 - 50
No. 4	0 - 15

Determine the soundness in accordance with AASHTO T104. Loss of more than 10% of the lightweight aggregate in five cycles of the accelerated soundness test using sodium sulfate is not permitted.

Ensure the lightweight aggregate is in a saturated surface-dry condition when it is proportioned and incorporated into the mix.